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The LOCO-WEED DISEASE



LOCO WEEDS are poisonous plants that have caused heavy losses of horses, cattle, and sheep in some parts of the West and Southwest. Three plants are known definitely to be locoes, a few others are probably injurious, and some suspected ones are harmless.

The loco plants, their distribution, characteristics, and effects upon animals eating them, are described in this bulletin. Illustrations of the plants and of poisoned animals accompany the descriptions.

Symptoms of poisoning and proper methods of feeding and treating locoed animals are detailed.

It has been proved, both experimentally and by the practical work of stockmen, that the locoes can be destroyed by digging and that the cost of the work is not excessive.

Contribution from the Bureau of Animal Industry

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THE LOCO-WEED DISEASE.

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EXTENT AND CAUSE OF THE DISEASE.

LOCO, meaning crazy, is of Spanish origin, and for many years has been applied popularly to a disease common among horses, cattle, and sheep in the Great Plains region of the West. The first printed record of the disease appears to have been in the report of the Commissioner of Agriculture for 1873, and the description of the symptoms of locoed animals in that report and in succeeding reports of the United States Department of Agriculture are among the most valuable written.

Losses of horses, especially in parts of Texas and Arizona, have been very large at times, while in some parts of Montana, Colorado, Nebraska, and Kansas, because of the large number that die of the disease, it has been found impossible to run horses freely upon the range. The losses of cattle have been heavier, perhaps, in Colorado, than in any other State, while the losses of sheep have occurred more frequently in the States further north, especially in Montana.

Much investigation, both in the field and in the laboratory, has been undertaken, but the results of the earlier studies were very contradictory. Many people became convinced that while there was a diseased condition among the live stock which doubtless caused very heavy losses, it was due to feed or other causes rather than to any specific poisonous effect produced by plants eaten. Most stockmen, however, were convinced that the disease was caused by eating certain plants, which on that account were known to them as "loco plants."

LOCO PLANTS.

A large number of plants have been called "loco weeds." Most of those suspected of being poisonous belong to the botanical family Leguminosæ, to which belong also the pea, alfalfa, and similar plants.

Because many leguminous plants found in the arid and semiarid regions of the West closely resemble one another, there is an unfortunate tendency in some regions to class as locoes a large number of plants, many of which are not only harmless but, on the contrary, furnish good forage.

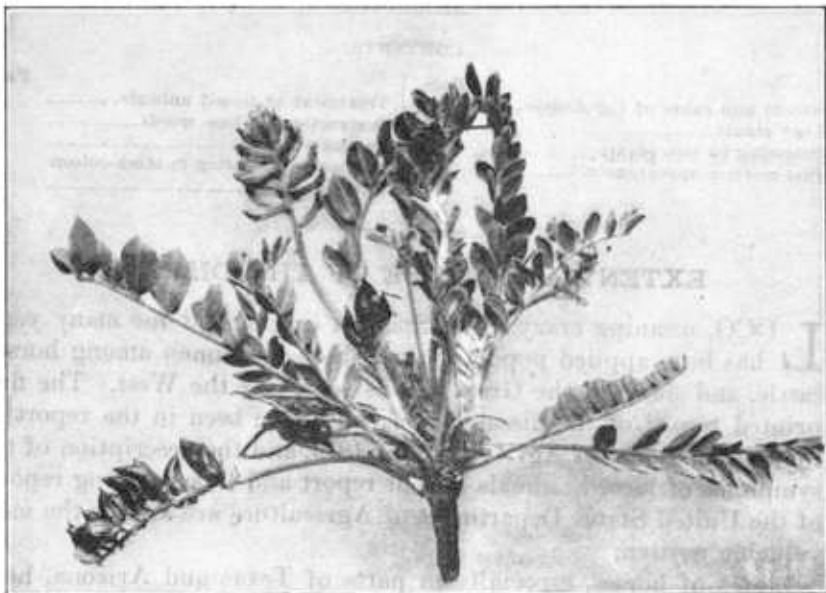


FIG. 1.—A small plant of the "purple" or "woolly" loco (*Astragalus mollissimus*). This plant is found in the shaded territory of the outline map shown in fig. 2.

At the present time only three plants are definitely known to be locoes. A fourth plant, of very limited distribution, is known to have poisonous qualities, and there is good reason to suspect others. On the other hand, certain suspected plants have been shown to be harmless. It is safe to say that nearly all the damage from loco is caused by the three plants described as follows:

THE PURPLE LOCO WEED.

The purple loco or the "woolly" loco, sometimes known as the "Texas" or "true" loco, is the plant that in the past has been considered the more probable cause of loco poisoning. The scientific name is *Astragalus mollissimus*. A small plant is shown in figure 1. In Texas, western Kansas, or western Nebraska, when one speaks of

“loco” that is the plant ordinarily meant. It is also referred to as the “stemmed loco plant,” because it has true stems, while the white loco weed is stemless.

The purple loco weed is a perennial, growing in patches on adobe soils, in depressions rather than in elevated situations. It rarely grows in the abundance which is characteristic of some of the other so-called “loco plants,” but patches of it may cover several acres. Under favorable circumstances, where a plant grows for several years, it may become perhaps a foot in height and occupy a space possibly 2 feet in diameter. The flowers are rather inconspicuous, with very deep-purple corollas, and the pods are short, thick, and black. The leaflets are ovate or elliptical and very densely covered with hairs, from which the plant gets its common name “woolly” loco. The long branches of the plant are inclined to lie rather close to the ground.

The purple loco plant is found as far north as South Dakota, as far south as Mexico, and as far west as parts of Arizona. Its eastern limit may be stated as central Kansas and Nebraska and the western part of Oklahoma. In those regions it grows in varying abundance. It blooms in Colorado about June 1, but farther South, in New Mexico, for instance, blossoms are found early in April. (See fig. 2.)

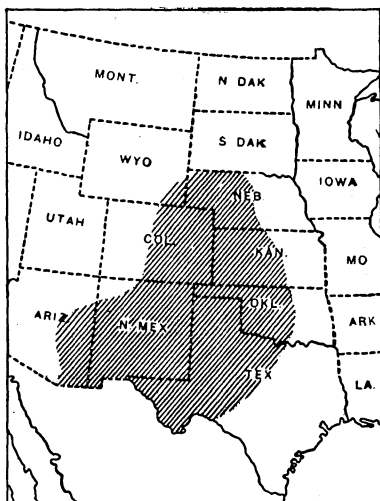


FIG. 2.—Distribution of the purple loco in the United States. A small plant of this variety is shown in fig. 1.

THE WHITE LOCO WEED.

The white loco plant (*Oxytropis lamberti*), shown in figure 3, is distinguished from the purple loco by its long, lance-shaped leaflets and by the general habit of the plant, which is erect rather than low and spreading. This is the plant commonly known in Wyoming, Montana, and in some parts of Colorado as “the loco.” It has no true stem, and on that account is sometimes called the “stemless loco.” The leaflets are more tapering and not so hairy as those of the purple loco, and are olive green in color.

The flowers ordinarily are on long stems and in the plains regions are commonly white, although there is considerable variation in their color. Purple flowers are not uncommon. In the mountain regions the white loco ordinarily has very deeply colored flowers, dark

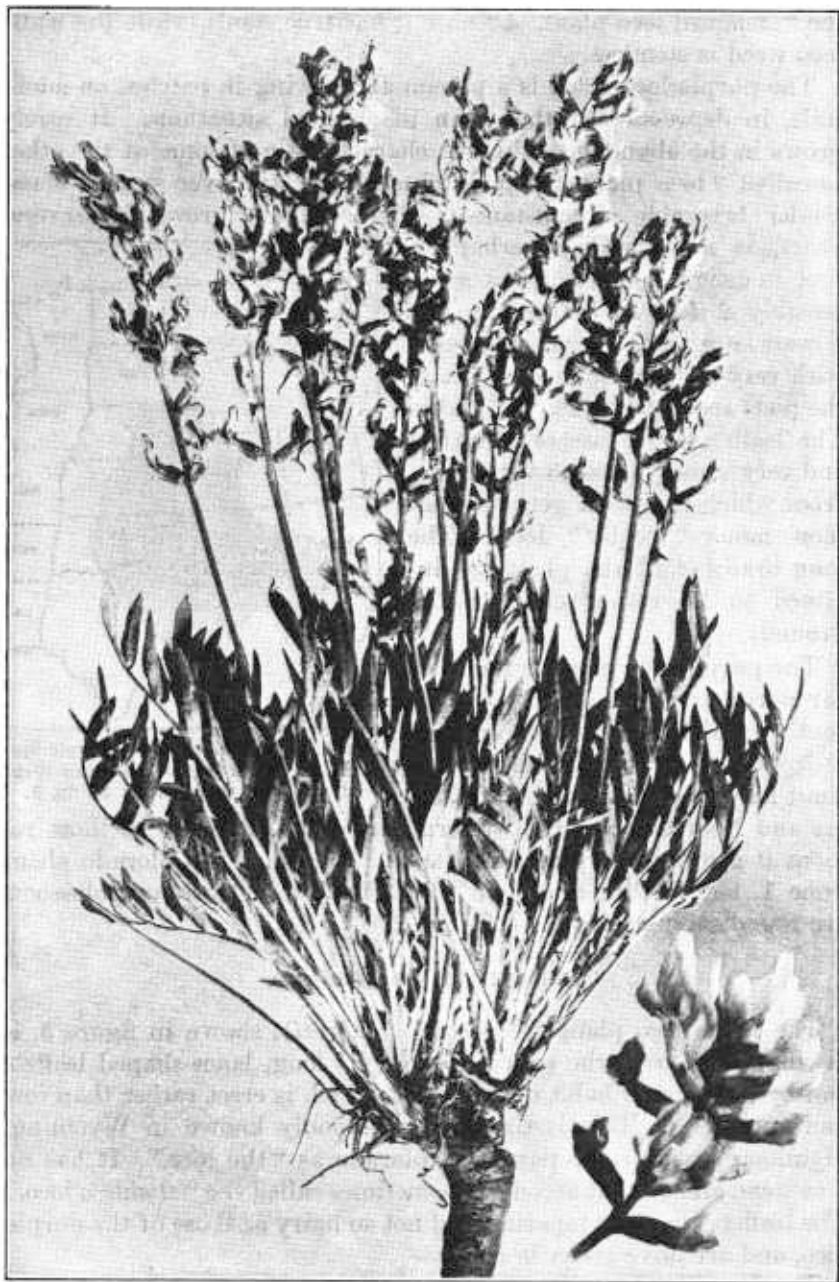


FIG. 3.—White loco (*Oxytropis lamberti*) in bloom. This is much more widely distributed than the other loco plants, as is shown by the shaded portion of the outline map in fig. 4.

shades of violet and purple. It blooms earlier than the purple loco. Plants bloom in Colorado in the latter part of April, and early in the summer the flowers and the pods are found upon the still erect flower stems. The pods are slender and filled with seeds. When dry they rattle as a person passes through a patch of the plants, making a sound which closely resembles the warning of a rattlesnake. On that account, in some localities, it is known as "rattleweed." Both this plant and the purple loco have extremely long roots, growing down from 3 to 6 feet.

Much more widely distributed than the purple loco, the white loco plant is found from Alaska to Mexico, as far east as central Minnesota and as far west as central Utah and Arizona. (See fig. 4.) It grows largely on slight elevations and on sandy soil, and in some places in very great abundance. In parts of Colorado, Wyoming, and Montana, at the time of blossoming, large areas are as white as though covered with snow, and in the foothill regions of these States the patches of beautiful, dark-colored flowers are very striking.

Oxytropis lamberti goes under the common names of "white loco" and "rattleweed." In the mountains, however, the term "white loco" sometimes is applied popularly to another leguminous plant. On account of the color of the flowers in the mountains it is also sometimes known as the "pink loco."

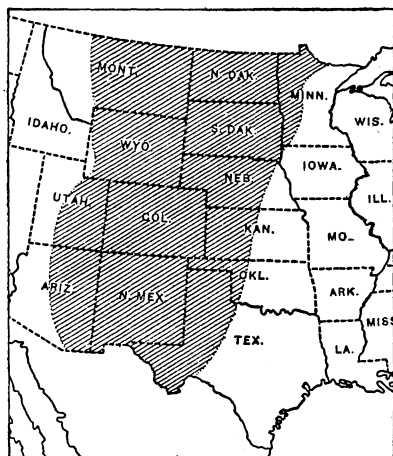


FIG. 4.—Distribution of the white loco (*Oxytropis lamberti*) in the United States. A plant of this variety in bloom is shown in fig. 3.

THE BLUE LOCO OR "RATTLEWEED" OF ARIZONA AND NEW MEXICO.

In western New Mexico and Arizona a common loco, most generally known as "rattleweed," is the plant known to botanists as *Astragalus diphysus*, shown in figure 5. It is very different in its appearance from either the white or the purple loco. The leaflets are small, ovate to oblong, and of a deep-green color much like alfalfa. In fact, the plant closely resembles alfalfa in its size, color, and general appearance. The flowers are purple or violet, and on that account it is sometimes called the "blue loco." The pods are inflated and bladderlike, and when immature are streaked with purple.

As shown in figure 6, the blue loco is distinctive of the Southwest and has a somewhat restricted range. It is, perhaps, the most common loco of Arizona and western New Mexico, and is the plant spoken of in that region as "the loco." It extends into southwestern Colorado, southern Utah, and southern California, in many places growing in great abundance and covering many acres. It appears in

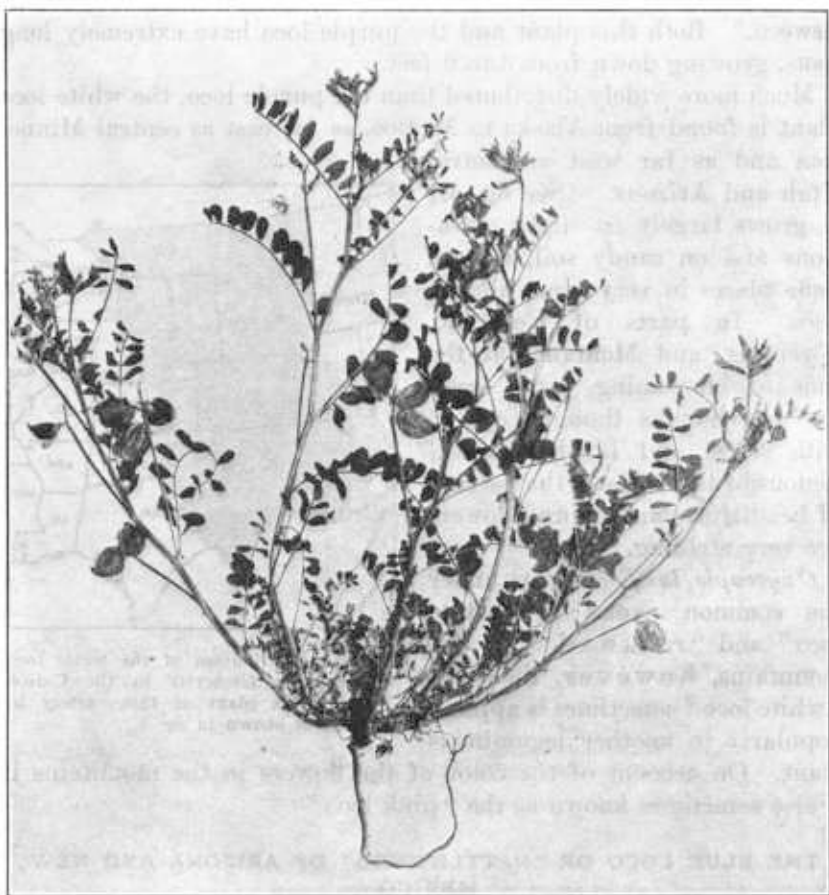


FIG. 5.—The blue loco (*Astragalus diphysus*), showing flowers and pods. This plant is very abundant in parts of Arizona, New Mexico, and southern Utah.

some localities the last of January or early in February, and matures and dries up early in the summer. While the plant is poisonous to cattle and sheep it is especially injurious to horses.

Experimental work shows that the blue loco is more poisonous to horses than to sheep, and more poisonous to sheep than to cattle. As compared with the white loco it is about twice as poisonous to horses

and sheep and about half as poisonous to cattle. When dried it retains its poisonous character, and extensive losses have occurred after the maturity of the plant.

SUSPECTED PLANTS WHICH ARE NOT LOCOES.

A great many leguminous plants, suspected of being locoes, are either harmless or, as in some cases, are valuable as forage crops. Their number is so great that it would be impracticable even to list them, but two are so widespread that it is worth while to give a brief description to convince the stockman that he has no reason to fear them.

The plant shown in figure 7 (*Astragalus nitidus*) is found abundantly in some regions, sometimes associated with the white loco. It occurs most commonly in the foothill region of the eastern slope of the Rocky Mountains, but sometimes extends into the plains region. The leaflets resemble, in form, those of the white loco, but are of a deep-green color instead of olive green. The plant is distinguished too by its rather stout stems and the purplish and not very conspicuous flowers, which are in compact heads resembling those of clover. Frequently it is found growing in fairly thick

masses in shaded places, like the edges of aspen groves, whereas the white loco grows better in the open. Though *Astragalus nitidus* is considered by many as a loco plant, careful experiments have proved its harmless character, and probably it should be classed as one of the desirable forage plants.

The plant shown in figure 8 (*Astragalus drummondii*) is large and rather coarse, is found from Utah, Colorado, and Nebraska northward, and is distributed over the same regions as the white loco. It has yellowish-white flowers, and both the flowers and pods droop from their attachments, and by this habit the plant is readily recognized. It is not a loco plant and its coarseness renders it unattractive to grazing animals.

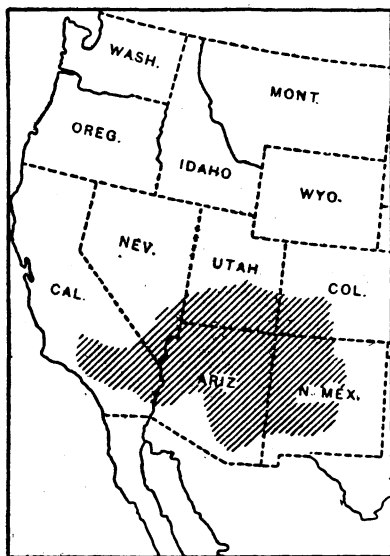


FIG. 6.—Distribution of the blue loco or rattleweed (*Astragalus diphysus*) in the United States. The plant, with flowers and pods, is shown in fig. 5.

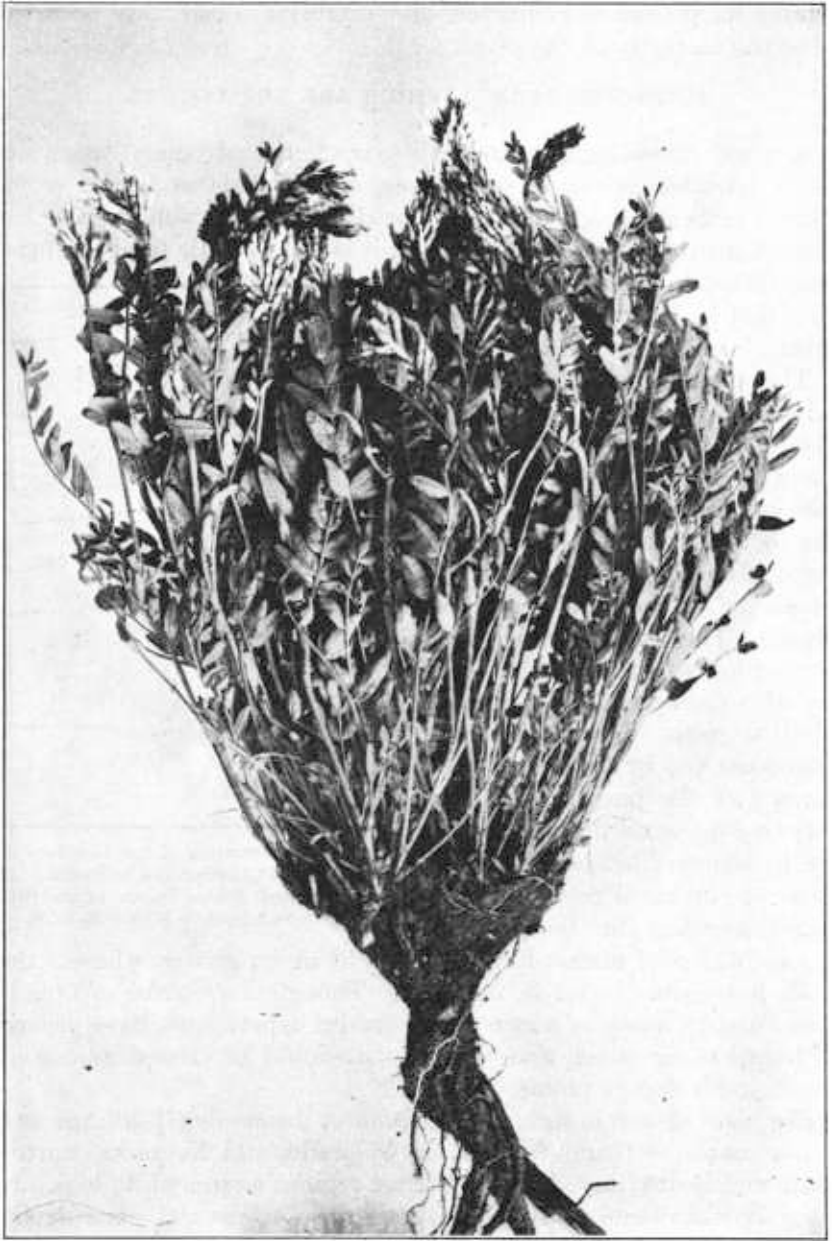


FIG. 7.—*Astragalus nitidus*. This plant resembles the loco plants, but it is not poisonous, though often suspected of being so. This and the one shown in fig. 8 are widely disseminated on the eastern slope of the mountains and in the Great Plains region, but have been given no common names.

POISONING BY LOCO PLANTS.

When the loco investigation was first undertaken by the United States Department of Agriculture there was a general belief among stockmen that the purple (woolly) loco was a poisonous plant and a less general belief that the white loco weed was injurious. The blue loco was generally recognized in the regions where it grew abundantly as a poisonous plant.



FIG. 8.—*Astragalus drummondii*. This plant is not poisonous, but sometimes is thought to be a loco. Like the one shown in fig. 7, it has no common name.

Field work carried on during several years has demonstrated that horses, cattle, and sheep in the field can be poisoned by feeding on these three plants. It has also been shown clearly that the purple loco weed is rarely injurious to cattle. Where the purple plant is the only loco weed known, the losses from poisoned stock are limited almost exclusively to horses. Apparently, cattle will not eat the plant readily. The experiments show that under ordinary circumstances most cattle would prefer to starve rather than eat purple loco weed. Most horses do not take readily to it unless in the first place they are induced to eat it because of short feed. It has been demonstrated that the so-called loco disease of the plains is not

simply a matter of starvation, as many have supposed, though it is also clear that when other feed is abundant very few horses will eat loco. When, however, because of scarcity of grass, a horse is induced to begin the eating of loco, it is very likely to contract a habit, which leads to continual feeding on the weed, eventually with fatal results.

In regard to the white loco weed, experiments have shown very clearly that horses, cattle, and sheep will eat it with great readiness, particularly when grass is somewhat scarce. Both the white and the purple loco weeds are green during the winter, when all grass on the plains is dry and brown. They are prominent plants, too, which induces an animal to try them, and because of their succulent character and somewhat pleasant taste, it may continue to eat them. Not only horses but cattle and sheep will eat the white loco weed, and sometimes even with great avidity. Many animals eat it even when grass is abundant, but it is more common for the habit to be contracted during the autumn, winter, and spring, when green grass is scarce. Both horses and cattle eat the white loco readily, but perhaps cattle take to it more readily than horses. During the spring, before the grass starts, where the white loco weed is abundant, practically all animals eat some of it. As the grass becomes more abundant, many of the animals leave the loco weeds and eat grass only. These animals, as a rule, do not seem to be injured by the habit. Others, however, acquire an appetite which is not easily overcome, and will continue to eat the weed even where there is an abundance of other feed. Whether an animal will become locoed or not is then simply a matter dependent on the individual. Some cattle and horses eat loco weeds during a part of the year for several years and suffer no harm. Others acquire a habit which leads them to eat this plant almost exclusively and die within a few months or, in some cases, even within a few weeks.

Sheep, also, are poisoned in much the same way as horses and cattle. The effect of the poisoning seems to be peculiarly noticeable on lambs. Frequently they die within two weeks of the time they commence to eat the weed, and without any marked loss of flesh.

Under similar conditions of short feed, the blue loco weed is eaten late in the winter. Because of its great poisonous effect on horses, results may come more quickly than in the case of the other loco plants, and heavy losses sometimes occur in a short time.

There is considerable difference also in the readiness with which various breeds of animals will eat loco weeds. It is a matter of common observation upon the plains that the so-called "native breeds" are very much less likely to be locoed than are imported animals. This, of course, is to be expected, from the fact that the imported animals are not familiar with the plants, and in many cases do not have the quality of "rustling," so that they are inclined to eat the feed which is most easily obtained rather than seek more suitable

plants. Generally speaking, the finer breeds of cattle and horses are more likely to be locoed than the poorer breeds. The same thing is true of sheep, it being particularly noticeable that the black faces are much more apt to be locoed than are the Merinos.

SYMPTOMS OF POISONING IN HORSES.

The first symptom of loco poisoning in horses is often a change in the general condition of the animal. If high-spirited, the animal becomes somewhat dull. Following this, irregularities in its gait and in its mode of eating appear. The irregularities in the gait may be due partly to weakness and simulate a paralytic affection. The horse drags its feet more or less; this is particularly noticeable in the hind legs. Associated with this paralytic condition is an apparent loss of



FIG. 9.—A typical locoed horse. Note the abnormal growth of tail and mane, which is characteristic of the disease.

normal muscular control. In stepping over a slight obstruction, the horse lifts its feet unnecessarily high, or, in going over a rut in the road, it may leap as if jumping over a ditch.

As the disease progresses, the animal becomes solitary in its habit, and seems to lose very largely its nervous sensibility. If one approaches a badly locoed horse, the latter does not notice the person until within a few feet, when it may suddenly rear and perhaps fall over backward. When it drinks or eats, there is a peculiar, stiff motion of the jaws, showing a lack of control of the muscles. If a locoed horse is used either in riding or driving, the lack of muscular control may make it extremely dangerous, as such a horse shies violently at imaginary objects, can not readily be led or backed, and if started in motion is inclined to go on in an automatic fashion at the same gait until stopped by some obstruction. In the latter stages of the disease, the animal loses flesh, its coat becomes rough, and eventually it ceases to eat and dies. Figure 9 shows a typical locoed horse.

SYMPTOMS OF POISONING IN CATTLE.

The symptoms of locoed cattle are similar to those of locoed horses, the differences being only such as would be expected from the different character of the nervous organization of the animals. There is the same lack of muscular control, and while a steer is not likely to fall over backward, it will start and tremble and perhaps rear and jump backward when suddenly alarmed. A badly locoed steer shows a violently shaking head, particularly after it has become heated. Ordinarily a locoed steer is dull, but under some conditions it may become frantic and run into obstructions in an utterly unreasonable way. It is commonly said by stockmen that it is impossible to drive a locoed steer because it is just as likely to run into the driver as in the opposite direction.

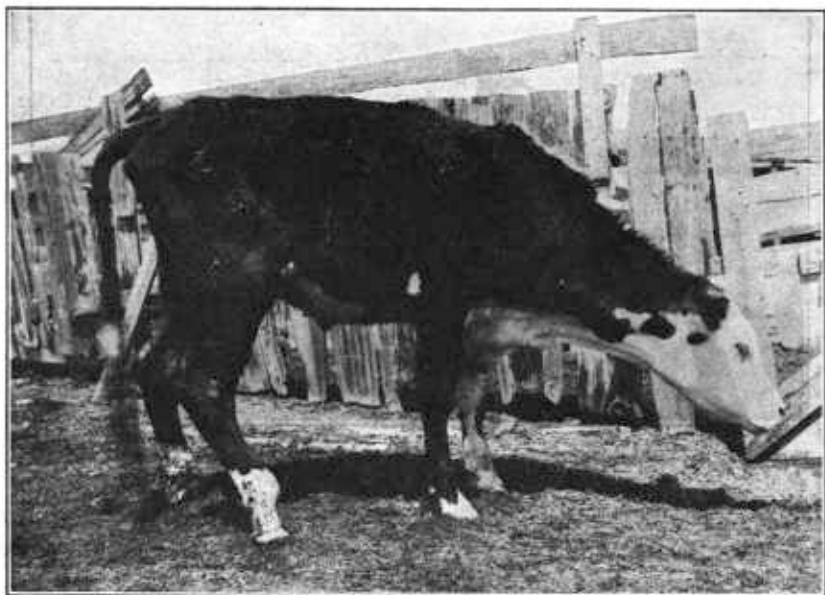


FIG. 10.—A typical locoed steer. Locoed cattle have rough coats, staring eyes, and in the last stage, eat and drink very little.

Locoed cattle gradually lose flesh, have staring eyes, rough coats, go to water less and less frequently, and eventually die of starvation.

A typical locoed steer is shown in figure 10.

Loco is generally supposed to predispose to abortion, and in locoed herds the calf crop is seriously reduced.

SYMPTOMS OF POISONING IN SHEEP.

The symptoms of poisoning in sheep are not so marked as those in horses and cattle. The lack of muscular control is not so noticeable, but still exists. Locoed sheep show, perhaps, more clearly the

weakness which goes with the disease, as they stumble and fall and rise again only with great difficulty. The symptoms of loco poisoning in sheep resemble the symptoms caused by "grub in the head," and at times it is difficult to distinguish between sheep affected by the grub of the sheep gadfly and those poisoned by loco weeds.

Figure 11 shows a typical locoed sheep.

POST-MORTEM APPEARANCES.

Post-mortem examinations of locoed animals do not always show clearly marked evidence of the progress of the disease. Since in all cases of fatal poisoning the locoed animals die of starvation, they

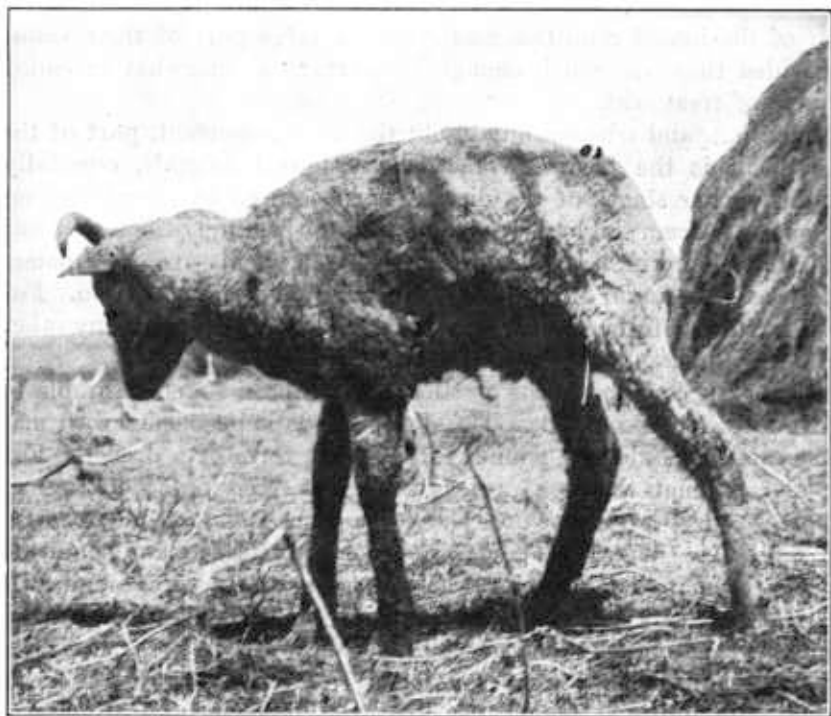


FIG. 11.—A typical locoed sheep shortly before death.

are profoundly anemic, as would be expected, and as a result accumulations of coagulated serum in a gelatinous form are found in various parts of the body, particularly about the heart. There is also an accumulation of coagulated serum in the cavity of the spinal column. This condition almost always exists when the loco poisoning has become chronic. The nervous system is more fully supplied with blood than when the animal is in normal condition.

The poisonous substance in the loco plants produces an irritant effect upon the stomach and intestines, which in most locoed animals

results in an inflamed condition of the walls of the stomach. In horses it is common to find ulcers in the stomach near its outlet; in cattle and sheep similar ulcers are found in the fourth stomach.

TREATMENT OF LOCOED ANIMALS.

Experiments with substances which would be logical antidotes for loco poisoning have been disappointing, and at the present stage of the investigation there seems to be no reason for hoping that a practical antidote can be found. During the course of the experimental work, however, attempts were made to treat the animals in accordance with the more pronounced symptoms, and the treatment was so successful that it can be said that it is possible to bring most animals out of the locoed condition and restore a large part of their value, provided they are worth enough to warrant a somewhat extended course of treatment.

The first, and without any doubt the most important, part of the treatment is the feed. In fact, many locoed animals, especially in the earlier stages of the disease, can be cured by simply taking them away from the loco weeds and giving them nutritious feed like alfalfa and grain. All chronically locoed animals are constipated, and the feed should be of a character to remove that condition. For this purpose alfalfa and oil meal have been used, although any other feed having laxative properties is useful.

When the constipation is obstinate, it has been found desirable to give doses of Epsom salt. The dose used in experiments with mature cattle was about 1 pound, given in the form of a drench. For younger animals the dose was smaller, calves receiving not more than 2 ounces. For horses the dose should be about 8 ounces, and for full-grown sheep 4 ounces. The doses varied with the size and condition of the animal, but commonly rather small doses were found sufficiently effective. It was not necessary to repeat the treatment many times, provided care was taken to give laxative feed.

Many experiments were conducted to determine what remedy would best improve the nervous condition of horses and cattle, and the results seemed to show that for horses nothing was better than arsenic in the form of Fowler's solution, while for cattle the greatest success was obtained by the use of strychnin. Fowler's solution was given in daily doses of 4 to 6 drams or 20 cubic centimeters in the grain or in the drinking water of the horses. This dose is roughly equal to 4 to 6 teaspoonfuls. It is most conveniently measured out by the use of 4 or 8 dram homeopathic vials. These doses should be continued for a considerable period, the time varying with the individual animal, but ordinarily for not less than one month.

The strychnin was given in hypodermic doses, the cattle being run through a chute and treated one after another. Locoed animals

are very sensitive to strychnin, and it was found necessary to give it in extremely small doses. The daily doses should not ordinarily exceed three-twentieths or four-twentieths of a grain or 0.009 to 0.012 of a gram. Large animals may take as much as one-half grain, but that is a maximum dose and often will be found too much. It is well to use one-twentieth grain tablets dissolved in water and the needle inserted in the shoulder. The treatment should be continued, as in the case of Fowler's solution, for a considerable time, ordinarily 30 days or more. The fact should be emphasized that the doses of strychnin should be very small. It was found that animals could be killed very readily with what are considered the common veterinary doses, but in small quantities the results were distinctly beneficial.

It was also found that sodium cacodylate when given to cattle in hypodermic injections of 6 grains, or 0.4 gram, daily, commonly gave beneficial results. The best results, however, were obtained from the use of strychnin and Fowler's solution as already outlined. Badly affected cattle were taken and, after treatment, were turned out in suitable condition to be sold for fat beef, while horses which were absolutely worthless recovered and became entirely usable, although probably they were not in so good condition as they would have been if they had not been poisoned. The experiments show conclusively that the majority of horses or steers can be brought into good condition if they are valuable enough to be treated in this way.

The fact should be emphasized that very rapid recoveries can hardly be expected. The condition existing in a case of chronic loco poisoning has been brought about gradually by weeks or months of loco feeding, and the rate of recovery must necessarily be rather slow.

Much can be accomplished in the way of preventing loco poisoning by the proper handling of stock. As already stated, stock commonly contract the habit of loco feeding in times of short feed. Feeding hay during the period prevents many animals from acquiring the habit. On some ranges the loco weeds have a rather definitely limited distribution; in such cases, if kept away from the infested areas until the grass is started, few animals become locoed.

DESTRUCTION OF LOCO WEEDS.

A common but erroneous belief among the stockmen of the infested regions is that in order to destroy the loco plants it is necessary to dig up the whole root, so that it has seemed to them almost impossible to clear a field infested with loco, even though the field is small. This impression in regard to the necessity of digging the whole root is false. If the loco weeds are cut off below the crown of buds, the plants are killed; there is no danger of sprouts from the roots. It is only necessary to cut the root off 2 or 3 inches below the surface. The

seeds of loco plants live for years and all do not germinate in the season following their growth. Consequently, in any field infested with loco, there will be a continuous crop of seedlings, as the seeds germinate under favorable circumstances.

The impression that plants grow from the cut roots probably originated in the fact that seedlings are continually coming up in the immediate vicinity of a parent plant. The seeds of the loco weeds are not provided with any special means of dispersal by the winds. Ordinarily they fall near the parent plant and grow there. Of course the winds which move the dust of the surface carry the seeds from one place to another, but under ordinary circumstances they are not scattered for any considerable distance.

CUTTING THE PLANTS BELOW THE CROWN.

It follows that reseeding from other pieces of ground, even when in the immediate vicinity, is not to be feared. The destruction of loco weeds in pastures is a comparatively easy matter. A man with a spade can destroy the plants with great rapidity. A few days' work accomplishes much more than one would expect. Because of the seeds which germinate later, it is necessary for the work to be done two or three times during a season, and it must be repeated during succeeding seasons. It has been demonstrated at Hugo, Colo., that the work is not very laborious. The loco-free pasture which was used for experimental purposes was cleared the first year of the experiment by a few days' work, and with very little labor it was kept free from loco during the course of the experimental work. The pasture has been kept under observation for 10 years and very few plants have appeared in that time, showing that it was a fairly permanent job.

Ranchmen in the neighborhood of the Hugo experiment station cleared patches of ground, some of which have been observed repeatedly in the years that have elapsed. Results show clearly that the work has been an economical success and that while some additional cutting has been necessary, the destruction of loco plants has been reasonably permanent. The work by the ranchmen was mostly on the white loco and the station work was on both the white and purple. Generally speaking it is much easier to dispose of the purple loco, for it grows in limited patches, but the white loco may be thickly distributed over many acres.

L. V. Medley, of Magdalena, N. Mex., reports an interesting series of experiments performed by him and his father in cutting out the blue loco of New Mexico. In 1906 they dug out a pasture of 80 acres, in which very little loco has appeared since. In 1916 they cleared out a pasture of eight sections, in which he estimated that the loco covered about one-fourth of the pasture. The

men doing the work were required to get at least 2 inches of the root. The work cost nearly three dollars an acre, but it was considered that the money was well spent, as it meant practically a permanent clearing of the land.

INSECT ENEMIES OF THE LOCO PLANT.

Certain insects work on the roots of the loco plants, and in some cases cause extensive destruction. At times in Colorado, western Kansas, and Nebraska, the purple loco weed is destroyed to a very large extent by the larvæ of a moth known to entomologists as *Walshia amorphella*, and there is reason to believe that the work accomplished by the larvæ reduces the quantity of the purple loco weed to such an extent that for a few years loco poisoning from the plants is very slight. Doubtless, after several years, the work of the insect loses its efficiency, and the plant will have another cycle of renewed activity. Insects, especially the grubs of a weevil (*Cleonus quadrilineatus*), also work on the white loco weed, but so far they have not caused such destructive effects as have been noticed in the case of the purple loco. During exceptionally dry seasons very few of the loco seeds germinate, and if, at the same time, the insects are abundant, as was the case during the summer of 1908, the numbers of loco plants become greatly reduced.

SUMMARY.

The loco weeds are leguminous plants growing in the arid and semiarid regions of the West. They cause heavy losses of horses, cattle, and sheep, with characteristic symptoms.

Three distinct kinds of loco plants are known, the "white loco" (*Oxytropis lamberti*), the "purple loco" (*Astragalus mollissimus*), and the "blue loco" (*Astragalus diphysus*).

Of the three loco plants, the purple affects horses, the blue affects mostly horses but also cattle and sheep, while the white causes heavy losses of all three classes of animals.

While it is reasonably certain that there are other loco plants, the three mentioned, without doubt, are responsible for most of the losses caused by locoes.

Locoed animals may recover under careful feeding, but the cure is hastened by the use of Fowler's solution for horses and strychnin for cattle.

The loco weeds may be destroyed by digging, to accomplish which it is necessary to cut the root 2 or 3 inches below the surface of the ground.

In some localities much can be accomplished in the way of preventing loco poisoning by feeding horses, cattle, and sheep during periods of short feed, and by keeping the stock away from infested areas.

